COINS Seminar #9

" Implantable Optical Biosensors – Materials and Instrumentation for Next-Generation Monitoring"

Prof. Michael J. McShane

Texas A&M University, U. S. A.

Date: June 29, 2015

Time: 4pm ~ 5pm
Venue: #3001, Innovation Center of Nanomedicine (iCONM)
(See access map to next page)
Capacity: 40 people
Application: By E-mail (jimukyoku-coins@kawasaki-net.ne.jp)
Please send your "name" and "Affiliation"

—Abstract—

Personal health monitoring is becoming increasingly accessible. The ease of producing low-cost, low-power embedded systems has fueled a rapid growth in consumer products aimed at "measuring me." Common examples include activity trackers, pulse and heart rate monitors, and sleep assessment tools. While new products are released regularly, a major technology gap is in the space of *continuous chemical sensing*. Commercial devices for continuous glucose monitoring are examples of progress in this area; yet, they are invasive and lack longevity. Fully implantable or completely noninvasive systems face significant hurdles to implementation. Our research is focused on developing miniature, injectable, "passive" biosensor implants with microscale and nanoscale organization to enable observation of interstitial biochemistry. These materials provide specificity through use of specific receptors and enhance sensitivity through optical amplification, and they employ materials that can integrate naturally with tissue, such as porous gels and microparticle suspensions. While aimed primarily toward the long-term goal of personal health monitoring, these systems may provide opportunities for advanced basic research as well as potential clinical applications. Towards this goal, with an emphasis on monitoring of diabetes and other chronic conditions, we have demonstrated hydrogel-based biochemical sensors that change optical properties as measured by luminescence intensity and lifetime or Raman scattering. This talk will describe several examples of these materials and the under-lying motivation for their design, particularly highlighting the major challenges to long-term monitoring. To conclude the talk, recent *in vivo* observations revealing interesting apparent physiological changes will be presented. The data illustrate the feasibility of this approach, but also open new questions and new ideas about the value of collecting chemical information continuously.

* Organizer: Center of Innovation (COI program) by JST

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COINS
Center of Open Innovation Network for Smart Health

<Venue access>

Name: Innovation Center of Nanomedicine (iCONM)

Address: 3-25-14, Tonomachi, Kawasaki-ku, Kawasaki 210-0821, JAPAN

Access by train:

Keikyu-Kawasaki Sta. to Kojima-Shinden Sta. by Keikyu-Daishi Line (ride time about 10 minutes) and Walk about 15 minutes to iCONM (See below access map)

Access by bus

"Bus stop on East Terminal at JR Kawasaki Sta."

1) No. 20 bus stop (KAWASAKI TSURUMI RINKO BUS Co.,LTD)

川 (kawa) 02 line; Tonomachi terminal, to "Tonomachi" bus stop (ride time about 30 minutes), walk about 3 minutes to iCONM from the BS

2) No. 20 bus stop (KAWASAKI TSURUMI RINKO BUS Co.,LTD)

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Access Map